



Figure 1. Map showing a restricted area of Sepetiba Bay, indicating the sightings of a rough-toothed dolphin (*Steno bredanensis*) from dedicated survey effort (star), citizen videos (diamond), and sightings of Guiana dolphins (*Sotalia guianensis*) (circle). Marina developments, such as Port I or Itaguaí, Port II or Sudeste, and Submarine Shipyard or BNB, are delineated.

observation of the dolphin, on five different occasions, and those observations are described below:

1. On 20 March 2019, the rough-toothed dolphin was seen slowly travelling near a dock at Port II or Sudeste (Figure 1). After our vessel approached the area, the dolphin started swimming around the boat. A GoPro camera was placed in the water; in several frames, the dolphin pointed its rostrum at the lens and click trains and buzzes were recorded. Air bubbles from the blowhole were also recorded (a supplemental video is available on the “Supplemental Material” page of the *Aquatic Mammals* website: https://www.aquaticmammalsjournal.org/index.php?option=com_content&view=article&id=10&Itemid=147). After interacting with our boat for 5 min, the dolphin approached a fishing boat (caico) that was passing around 20 m away. A fisherman from the boat offered the dolphin a fish, but the dolphin refused it. When the fishing boat departed the area, the

dolphin followed it for approximately 1 km, swimming astern near the boat propeller (Figure 2a). After leaving the fishing boat, the dolphin returned to interact with our boat for the next 5 min, swimming in the wake from our boat for approximately 2 min and leaving it to return to the area where we had first observed it. This observation of the dolphin lasted 26 min.

2. On 26 March 2019, the rough-toothed dolphin was initially seen slowly traveling (~2 km/h) at the BNB (Figure 1). We could not approach the animal because it was in a restricted navy area; therefore, its behavior was observed from a distance (roughly 800 m). The dolphin zigzagged very short distances (~150 m) and made three dives lasting about 1.5 min each. Mullet (*Mugil* sp.) were seen leaping above the water near the dolphin. A group of approximately 30 Guiana dolphins were seen foraging 1.5 to

Table 1. Video descriptions and behavioral observations performed by the authors from citizen videos of the solitary sociable rough-toothed dolphin (*Steno bredanensis*) in Sepetiba Bay

Video number	Duration (s)	Date	Location	Filming platform	Behaviors observed
1	31	23 Nov 18	BNB	Land	Three “somersaults”: the animal completely comes out of the water and re-enters on its head or sides (see supplemental video)
2	14	28 Nov 18	BNB	Land	One “somersault”
3	35	7 Feb 19	Port I (Itaguaí)	Boat	Slow travel by the docking area where a large cargo ship was stationed
4	35	8 Feb 19	Port I (Itaguaí)	Boat	Slow travel and rolling on its side underwater, inquisitively positioning its eye toward the person filming
5	91	20 Feb 19	BNB	Boat	Four tail slaps, rapid circular travel (“chase”), and a deep dive exposing the peduncle at the end of the footage (see supplemental video)
6 (a-f)	84 (total of six separate videos)	2 March 19	Port II (Sudeste)	Kayak	Slow travel around the kayak, skimming the water with only the tip of the dorsal fin exposed and positioning its rostrum directly toward the kayak; bubbles were also seen around the kayak.
7 (a-d)	780 (total of three separate videos)	24 June 19	Anchorage tug	Boat	Slow travel between the buoy and anchored tug; the dolphin was playing with an adrift plastic bag and also rubbing itself against the anchor line.

2.5 km away, but no interaction between the rough-toothed dolphin and the Guiana dolphins was observed. This observation lasted 20 min.

- On 4 April 2019, similar to the observation from 26 March, the rough-toothed dolphin was initially seen slowly traveling at the BNB, moving short distances in a zigzag pattern and making 1-min dives. Again, schools of mullet were observed leaping out of the water near the dolphin. Two Guiana dolphins were seen 15 min before foraging approximately 1.5 km away. This observation lasted 69 min.
- On 31 May 2019, we received a call from a collaborator stating that the rough-toothed dolphin was located between a cargo ship and a dock displaying a strange behavior. We decided to immediately start searching for the dolphin, and we found it 1 h later at the same area described by the collaborator. The dolphin was playing with an aquatic plant (*Eichhornia crassipes*), carrying it on its dorsal fin and rostrum but also rubbing it against the ship’s hull; this interaction lasted for 50 min (Figure 2b). After leaving the plant, the dolphin started to ride our boat’s wake. We placed a GoPro in the water alongside the hull. The dolphin repeated the

behavior described on 20 March—that is, it pointed its rostrum at the lens and produced click trains, buzzes, and air bubbles for the next 20 min (see supplemental video). After investigating our camera, the dolphin swam back to the docked cargo ship and rubbed itself against the ship’s hull; it also lifted its tail out of the water and tail slapped the surface for the next 70 min, which allowed us to determine that this dolphin was a male (Figure 2c). When we departed, the dolphin was again next to the ship’s hull. This observation lasted 140 min.

- On 24 June 2019, we received a call from a collaborator stating that this rough-toothed dolphin was playing with an adrift plastic bag next to their anchored tug (see video 7 in “Behaviors observed” section, Table 1). We decided to search for the dolphin immediately, but only 2 h later it was sighted 2 km away from the place it had been originally sighted. When we sighted the dolphin, it was exhibiting feeding behavior and, as the research boat approached, it began to swim by and interact with our underwater camera for the next 20 min as described previously (see supplemental video). After leaving our boat, the dolphin resumed the foraging behavior with prolonged dives. This observation lasted 60 min.



Figure 2. (a) Rough-toothed dolphin and fishing artisanal boat with the fishermen almost touching the dolphin as it swims in the wake close to the boat; (b) playing with a floating fresh water aquatic plant and rubbing it against the ship's hull; and (c) tail up showing genital slit and anus, indicating it is a male.

The behavioral observations described herein and the frequency of our observations over several months indicate that this rough-toothed dolphin had become solitary and established a limited area of use of roughly 10 km² inside Sepetiba Bay (Figure 1). Our observations also indicated that the dolphin continued to exhibit relatively normal behaviors. The “somersaults” described in the “Behaviors observed” section for videos 1 and 2 in Table 1 may be related to solitary play behavior as described by Lockyer & Morris (1986). The tail slaps, rapid circular chasing, and deep dives documented in the “Behaviors observed” section for videos 3 and 5 (Table 1) could be indicative of foraging behavior (Cardoso et al., 2019). The inquisitive behaviors toward objects and vessels documented in videos 4, 6, and 7 (“Behaviors observed” section, Table 1), and during our survey effort on 20 March, 31 May, and 24 June when the dolphin positioned its eye and rostrum toward the camera, swam around the vessels, played with aquatic plants and a plastic bag, and rubbed against the ship’s hull and anchor line, clearly demonstrated this animal’s increasing interest in any form of interaction (see supplemental video). However, these behavioral interactions with research vessels and afloat objects (i.e., aquatic plants and the plastic bag) are not exclusive of solitary individuals but have also been described for wild populations as well as for other species of dolphins (Dudzinski et al., 1995; Kuczaj & Yeater, 2007; Kuczaj & Eskelinen, 2014; Rodriguez-Ferrer et al., 2019).

Reasons why this rough-toothed dolphin became solitary and chose the interior of Sepetiba Bay to reside are speculative. Most of its sighting locations were in an area where fishing activities and civilian boat traffic are restricted due to use by the Brazilian Navy. The lack of fishing activities and reduced civilian boat traffic might have created a refuge for fish species such as mullet, which are commonly reported as a prey item of rough-toothed dolphin (Wedekin et al., 2004; Cardoso et al., 2019), which, in turn, may have attracted the solitary dolphin to this restricted area. In addition to natural behaviors observed, the dolphin showed good body condition and no skin lesions associated with disease (Van Bressemer et al., 2015; Flach et al., 2019).

A total of 11 cetacean species have been reported as solitary sociable from the Families Delphinidae and Monodontidae, even though *Tursiops truncatus* and *T. aduncus* are the vast majority observed in the few studies published, with cases of females being outnumbered by males (Dudzinski et al., 1995; Frohoff et al., 2006; Nunny & Simmonds, 2019). To date, no rough-toothed dolphins have been documented as solitary or social; therefore, these observations represent the first record of a male

solitary sociable rough-toothed dolphin worldwide. Because the solitary dolphin continues to inhabit Sepetiba Bay, potential threats from increasing boat traffic and planned dredging activity within the same area used by the dolphin must be considered. Proper management and public education must be implemented to comply with the protective laws for cetaceans in Brazilian waters (Lodi & Barreto, 2000), to address potential concerns of animal welfare concerns, and to avoid the development of detrimental human behaviors toward the dolphin.

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Editor’s Note

There are two notes in this issue about the same rough-toothed dolphin. They present different but complementary information: Maciel et al. (2020) and Flach & Dias (2020).

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